In fact, processor **22** may include one or more of general-purpose computers, special purpose computers, microprocessors, digital signal processors ("DSPs"), field-programmable gate arrays ("FPGAs"), application-specific integrated circuits ("ASICs"), and processors based on a multi-core processor architecture, as examples.

[0128] Apparatus **10** further includes a memory **14**, coupled to processor **22**, for storing information and instructions that may be executed by processor **22**. Memory **14** may be one or more memories and of any type suitable to the local application environment, and may be implemented using any suitable volatile or nonvolatile data storage technology such as a semiconductor-based memory device, a magnetic memory device and system, an optical memory device and system, fixed memory, and removable memory. For example, memory **14** can be comprised of any combination of random access memory ("RAM"), read only memory ("ROM"), static storage such as a magnetic or optical disk, or any other type of non-transitory machine or computer readable media. The instructions stored in memory **14** may include program instructions or computer program code that, when executed by processor **22**, enable the apparatus **10** to perform tasks as described herein.

[0129] Apparatus **10** may also include one or more antennas (not shown) for transmitting and receiving signals and/or data to and from apparatus **10**. Apparatus **10** may further include a transceiver **28** that modulates information on to a carrier waveform for transmission by the antenna(s) and demodulates information received via the antenna(s) for further processing by other elements of apparatus **10**. In other embodiments, transceiver **28** may be capable of transmitting and receiving signals or data directly.

[0130] Processor **22** may perform functions associated with the operation of apparatus **10** including, without limitation, precoding of antenna gain/phase parameters, encoding and decoding of individual bits forming a communication message, formatting of information, and overall control of the apparatus **10**, including processes related to management of communication resources.

[0131] In an embodiment, memory **14** stores software modules that provide functionality when executed by processor **22**. The modules may include an operating system **15** that provides operating system functionality for apparatus **10**. The memory may also store one or more functional modules **18**, such as an application or program, to provide additional functionality for apparatus **10**. The components of apparatus **10** may be implemented in hardware, or as any suitable combination of hardware and software.

[0132] As mentioned above, apparatus **10** may be user equipment. In this embodiment, apparatus **10** may be controlled by memory **14** and processor **22** to utilize HARQ process grouping and subframe grouping to carry ACK/NACK transmissions, wherein HARQ process grouping divides HARQ processes into one or more groups, and subframe grouping divides a radio frame into one or more groups. Apparatus **10** may be further controlled by memory **14** and processor **22** to carry ACK/NACK transmissions.

[0133] According to another embodiment, apparatus **10** may be an eNB. In this embodiment, apparatus **10** may be controlled by memory **14** and processor **22** to receive ACK/NACK transmissions from user equipment, wherein HARQ process grouping divides HARQ processes into one or more groups, subframe grouping divides a radio frame into one or more groups, and one of a HARQ process group ID and a subframe group ID is transmitted when carrying ACK/NACK transmissions. Apparatus **10** may be further controlled by memory **14** and processor **22** to distinguish between HARQ process grouping and subframe grouping.

[0134] The described features, advantages, and characteristics of the invention may be combined in any suitable manner in one or more embodiments. One skilled in the relevant art will recognize that the invention may be practiced without one or more of the specific features or advantages of a particular embodiment. In other instances, additional features and advantages may be recognized in certain embodiments that may not be present in all embodiments of the invention.

[0135] One having ordinary skill in the art will readily understand that the invention as discussed above may be practiced with steps in a different order, and/or with hardware elements in configurations which are different than those which are disclosed. Therefore, although the invention has been described based upon these preferred embodiments, it would be apparent to those of skill in the art that certain modifications, variations, and alternative constructions would be apparent, while remaining within the spirit and scope of the invention.

1-20. (canceled)

21. A method, comprising:

utilizing HARQ process grouping and subframe grouping to carry ACK/NACK transmissions, wherein the HARQ process grouping divides HARQ processes into one or more groups and the subframe grouping divides a radio frame into one or more groups; and

carrying ACK/NACK transmissions.

22. The method according to claim **21**, wherein one of a HARQ process group identification and a subframe group identification is transmitted when carrying ACK/NACK.

23. The method according to claim **21**, wherein a downlink assignment index indicates how to carry the ACK/NACK in case of two codewords transmission of one physical downlink shared channel.

24. The method according to claim **21**, further comprising:

determining one of HARQ process grouping and subframe grouping to use.

25. The method according to claim **24**, wherein the determining comprises determining which grouping method to use through radio resource control signaling configured by a Node B.

26. The method according to claim **24**, wherein the determining comprises selecting one of HARQ process grouping and subframe grouping to use.

27. The method according to claim **21**, wherein a grouping indicator is transmitted when carrying ACK/NACK transmissions.

28. An apparatus, comprising:

at least one processor; and

at least one memory including computer program code,

the at least one memory and the computer program code configured, with the at least one processor, to cause the apparatus at least to

utilize HARQ process grouping and subframe grouping to carry ACK/NACK transmissions, wherein the HARQ process grouping divides HARQ processes into one or more groups, and the subframe grouping divides a radio frame into one or more groups; and

carry ACK/NACK transmissions.